In view of the following remarks, Applicant respectfully requests reconsideration and allowance of the subject application. This amendment is believed to be fully responsive to all issues raised in the July 27, 2006 Office

5   Action.

Rejections to the Claims

_35 U.S.C. 101_

Claims 1-7 are rejected under 35 U.S.C. 101 as being directed to non-

10   statutory subject matter. The Office contends that claims 1-7 are drawn to a computer implemented process that merely manipulates data or an abstract idea, or merely solves a mathematical problem without a limitation to a practical application in the technological arts. (_Office Action_, page 2.) Applicant respectfully traverses this rejection.

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Claims 12-15 are rejected under 35 U.S.C. 101 as being directed to non-statutory subject matter. The Office contends that claims 12-15 are drawn to functional descriptive material embodied on a computer readable medium (i.e., "data structures and computer programs which impart functionally when

20   employed as a computer component" at MPEP 2106.IV.B(1)). However, the program/algorithm itself merely manipulates data or an abstract idea, or merely solves a mathematical problem without a limitation to a practical application in

the technological arts. (*Office Action*, page 3.) Applicant respectfully traverses this rejection.

It is established law that an abstract idea, by itself, is considered to be
5   unpatentable subject matter under § 101. *See, e.g., AT&T Corp. v. Excel Communications, Inc.*, 172 F.3d 1352, 1355 (1999) (pointing out that laws of nature, natural phenomena, and abstract ideas have generally been identified by the Supreme Court as unpatentable subject matter). However, if such an idea is taken out of the abstract and employed in some type of process that
10   achieves a "new and useful end", the **process is** patentable subject matter, even if the idea by itself would not be. *Id.* at 1357. Thus, the relevant inquiry under § 101 becomes -- Is the idea being applied to achieve a useful end? *Id.* If so, then the § 101 threshold is satisfied. *Id.*

In *AT&T*, the invention was designed to operate in a telecommunications
15   system with multiple long-distance service providers. The system contained local exchange carriers ("LECs") and long-distance service (interexchange) carriers ("IXCs"). The LECs provided local telephone service and access to IXCs. Each customer had an LEC for local service and selected an IXC, such as AT & T or Excel, to be its primary long-distance service (interexchange)
20   carrier or PIC. The system involved a three-step process when a caller made a direct-dialed (1+) long-distance telephone call: (1) after the call was transmitted over the LEC's network to a switch, and the LEC identified the caller's PIC, the LEC automatically routed the call to the facilities used by the caller's PIC; (2) the PIC's facilities carried the call to the LEC serving the call recipient; and (3)

the call recipient's LEC delivered the call over its local network to the recipient's telephone.

When a caller made a direct-dialed long-distance telephone call, a switch (which could be a switch in the interexchange network) monitored and recorded data related to the call, and generated an "automatic message account" ("AMA") message record. This contemporaneous message record contained fields of information such as the originating and terminating telephone numbers, and the length of time of the call. These message records were then transmitted from the switch to a message accumulation system for processing and billing.

Because the message records were stored in electronic format, they could be transmitted from one computer system to another and reformatted to ease processing of the information. Thus the carrier's AMA message subsequently was translated into the industry-standard "exchange message interface," forwarded to a rating system, and ultimately forwarded to a billing system in which the data resided until processed to generate, typically, "hard copy" bills which were mailed to subscribers.

The invention at issue in this case called for the addition of a data field into a standard message record to indicate whether a call involved a particular PIC (the "PIC indicator"). This PIC indicator could exist in several forms, such as a code which identified the call recipient's PIC, a flag which showed that the recipient's PIC was or was not a particular IXC, or a flag that identified the recipient's and the caller's PICs as the same IXC. The PIC indicator therefore

enabled IXCs to provide differential billing for calls on the basis of the identified PIC.

One of the claims at issue – claim 1-- read as follows:

5   A method for use in a telecommunications system in which interexchange calls initiated by each subscriber are automatically routed over the facilities of a particular one of a plurality of interexchange carriers associated with that subscriber, said method comprising the steps of:

10   generating a message record for an interexchange call between an originating subscriber and a terminating subscriber, and

including, in said message record, a primary interexchange carrier (PIC) indicator having a value which is a function of

15   whether or not the interexchange carrier associated with said terminating subscriber is a predetermined one of said interexchange carriers.

In looking at the subject matter of this claim and finding the claim to pass

20   muster under 35 U.S.C. § 101, the Court looked to the *specification* and commented as follows:

In this case, Excel argues, correctly, that the PIC indicator value is derived using a simple mathematical principle (p and q).

25   But that is not determinative because AT&T does not claim the Boolean principle as such or attempt to forestall its use in any other application. It is clear from the written description of the '184 patent that AT&T is only claiming a process that uses the Boolean principle in order to determine the value of the PIC

30   indicator. The PIC indicator represents information about the call recipient's PIC, a useful, non-abstract result that facilitates differential billing of long-distance calls made by an IXC's subscriber. Because the claimed process applies the Boolean principle to produce a useful, concrete, tangible result without pre-

35   empting other uses of the mathematical principle, on its face the claimed process comfortably falls within the scope of § 101.

Here, the Court looked at the specification and found that the environment and use of the PIC indicator – that of providing differential billing – provided a useful, concrete and tangible result. That result, however, was not specifically recited in the claim. Rather, it was described in the specification.

5   Likewise, in the present case, the specification provides a description of the utility and tangibility of the recited subject matter. Specifically, page 7, line 24 – page 8, line 5 instructs as follows:

> 10   The described hashing techniques generate the same unique identifier even though some forms of attacks have been done to the original image, given that the altered image is reasonably similar to a human observer when comparing the altered image with the original image. However, if the altered image is visually different or the attacks cause irritation to the observers, the hash
> 15   function recognizes such degree of changes and produces a different hash value from the original image.

Furthermore, page 19, line 18 – page 20, line 5 instructs as follows:

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> The image hashing process described above, and implemented in the image hashing unit 40, can be used in many ways and in a number of contexts. For instance, the image hashing process can be used as an indexing system for a large database of images. In
> 25   this context, the image hashes X are stored in an indexing table 44 (Fig. 1) and used to rapidly index the associated images in the image storage 30.
> Another exemplary context is to use the image hashing process as a way to police search over the Internet to detect pirated
> 30   copies. Generally, this is done by randomly collecting images, hashing them, and comparing the image hashes to hashes of the original images. If the hashes match, the collected image is suspected as being a copy of the original.

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Accordingly, in these excerpts as throughout the document, it is evident that the claimed subject matter has a specifically described useful, concrete and tangible result and application.

In view of the above discussion, the Office has failed to show that claims 1-7 and 12-15 present unpatentable subject matter under § 101. Applicant respectfully submits that claims 1-7 and 12-15 comply with the patentability requirements of § 101 and requests that the § 101 rejections be withdrawn.

35 U.S.C. 102

Claims 1, 2, 4, 6, 8, 10, 12, and 15 are rejected under 35 U.S.C. 102(b) as being anticipated by U.S. Patent Number 5,689,639 issued to Schwarz (herein referred to as "Schwarz"). Applicant respectfully traverses this rejection.

Applicant's application describes a process for generating a hash value that represents an image. Images that are visually distinct are represented by different hash values while images that are visually similar are represented by identical hash values. Identical hash values representing similar images makes it possible to identify copies of an original image, even if the copy has been electronically modified (such as by the addition or removal of a watermark), but still appears visually to be the same image. Specifically, claim 1 recites:

A computer-implemented method for hashing an image, comprising:

receiving an image; and

deriving a single hash value representative of the image

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such that images that are visually distinct result in hash values
that are approximately independent of one another and images
that are different but visually similar result in identical hash values.

Schwarz does not disclose, "deriving a single hash value representative

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of the image such that images that are visually distinct result in hash values that
are approximately independent of one another and *images that are different*
but visually similar result in identical hash values," as recited in claim 1.

Schwarz describes a method for identifying changes in line-oriented data
sets, and transmitting an indication of an identified change. As applied to

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images, the described method is used to detect a range of lines that are filled
with pixels that are all one color; a range of moved lines; unchanged lines;
unchanged parts of a line; and/or ranges of a line with pixels that are all one
color. (*Schwarz*, column 5, lines 15-20.) A hash value is generated to
represent a portion of a single line, and compared with a hash value generated

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to represent a portion of another single line. Different hash values indicate that
the lines are not the same. Identical hash values indicate that at least the
portions of the lines represented by the hash values are the same. The entire
lines must be compared to determine whether or not the lines are indeed the
same. (*Schwarz*, column 3, line 61 - column 4, line 7; and column 6,

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lines 7-14.)

With reference to claim 1, the Office cites Schwarz Fig. 3 and column 6, lines 9-11. (*Office Action*, page 4.) Applicant respectfully disagrees with the Office's interpretation of the cited portions of Schwarz.

Schwarz Fig. 3 illustrates generation of a hash value based on a portion
5   of a line of data, as described in Schwarz column 3, line 67 – column 4, line 2, which states, "In the example to be seen in FIG. 3 the character codes (e.g., ASCII or EBCDIC) of the second and third column are used to form a 16-bit hash value 20." Schwarz goes on to state, "Because those hash values 20 cannot be unambiguous they only indicate where the lines can possibly be the
10 same or where the lines definitely differ from each other. In order to definitely know that lines are identical, it is necessary to do a comparison of the whole lines." (*Schwarz*, column 4, lines 3-7.)

Schwarz, column 6, lines 9-11 states, "Unchanged lines again must have identical hash values in both the current and the previous image and must
15 match exactly." This describes identical hash values for identical (i.e. "unchanged") images; this does not describe, "deriving a single hash value representative of the image such that...images that are *different* but *visually similar* result in identical hash values," as recited in claim 1.

A hash value as described in Schwarz is generated to represent only a
20 portion of a single line of an image, and hash values for portions of lines from separate images are then compared to determine whether or not the line portions represented by the hash values are identical. Schwarz clearly does not disclose, "deriving a *single hash value representative of the image* such that

images that are visually distinct result in hash values that are approximately independent of one another and *images that are different but visually similar result in identical hash values*," as recited in claim 1. Accordingly, claim 1 is allowable over Schwarz, and Applicant respectfully requests that the 102

5   rejection be withdrawn.

Claims 2 and 4 are allowable at least by virtue of their dependence on claim 1.

10   Claims 6, 8, and 12 recite elements similar to those recited in claim 1. Accordingly, claims 6, 8, and 12 are allowable over Schwarz for reasons similar to those stated above with reference to claim 1, and Applicant respectfully requests that the 102 rejection be withdrawn.

15   Claim 10 is allowable over Schwarz at least by virtue of its dependence on claim 8. Claim 10 may also be allowable for independent reasons.

Claim 15 is allowable over Schwarz at least by virtue of its dependence on claim 12. Claim 15 may also be allowable for independent reasons.

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35 U.S.C. 103

Claims 5, 7, 9, 11, and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Schwarz in view of "RIME: A Replicated Image Detector for the World-Wide Web" authored by Chang et al. (herein referred to as "Chang").

Claim 5 recites:

A computer-implemented method comprising:

receiving an image;

deriving a hash value representative of the image such that images that are visually distinct result in hash values that are approximately independent of one another and images that are different but visually similar result in identical hash values; and

watermarking the digital image using, in part, the hash value to produce a watermarked image.

The combination of Schwarz and Chang does not teach or suggest the following elements of claim 5:

- deriving a hash value representative of the image such that images that are visually distinct result in hash values that are approximately independent of one another and images that are different but visually similar result in identical hash values; and

- watermarking the digital image using, in part, the hash value to produce a watermarked image.

The Office clearly indicates that Schwarz is relied upon for teaching, "deriving a hash value representative of the image such that images that are visually distinct result in hash values that are approximately independent of one another and images that are different but visually similar result in identical hash

5   values;" and that Chang is relied upon for teaching, "watermarking the digital image using, in part, the hash value to produce a watermarked image." (*Office Action*, page 6.) The Office does not indicate that Chang adds anything to teaching of Schwarz with regard to, "deriving a hash value representative of the image such that images that are visually distinct result in hash values that are

10   approximately independent of one another and images that are different but visually similar result in identical hash values." Nor does not Office indicate that Schwarz adds anything to the teaching of Chang with regard to, "watermarking the digital image using, in part, the hash value to produce a watermarked image."

15   As described above with reference to the rejection of claim 1, Schwarz does not teach or suggest, "deriving a hash value representative of the image such that images that are visually distinct result in hash values that are approximately independent of one another and images that are different but visually similar result in identical hash values," as recited in claim 5.

20   Chang describes a method for generating feature vectors associated with images and comparing the feature vectors to identify matching images. Chang does not teach or suggest, "watermarking the digital image using, in part, the hash value to produce a watermarked image," as recited in claim 5. In

contrast, Chang teaches an *alternative* to watermarking. As stated in the first sentence of Chang, "This paper describes RIME (Replicated IMage dEtector), an ***alternative*** approach to watermarking..." (emphasis added). In the second paragraph of the Introduction, Change states, "Given an image registered by its

5   creator or distributor, RIME checks if copies of the image exist on the internet and returns a list of *suspect* URLs. The creator or distributor of the image can then check if the suspect images are indeed unlawful copies (for instance by using watermarks)." In page 59, paragraph 3, Chang states:

10   Many studies have proposed using watermark schemes to
            safeguard image copyright. These schemes add to the images
            the creator's or the distributor's identity. A watermark, however, is
            vulnerable to image processing, geometric distortions, and
            subterfuge attacks. ... We believe that the watermark still plays an
15   important role in authenticating image in courts of laws. After
            RIME provides the creator or distributor with a suspect list, the
            actual owner of the images can use watermark or other
            authentication techniques to prove ownership.

20   Chang does not teach or suggest watermarking a digital image. More specifically, Chang does not teach or suggest, "watermarking the digital image using, in part, the hash value to produce a watermarked image," as recited in claim 5. Accordingly, claim 5 is allowable over Schwarz in view of Chang, and Applicant respectfully requests that the 103 rejection be withdrawn.

Claims 7 and 11 recite elements similar to those recited in claim 5. Accordingly, claims 7 and 11 are allowable over Schwarz in view of Chang for reasons similar to those stated above with reference to claim 5, and Applicant respectfully requests that the 103 rejection be withdrawn.

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Claim 9 is allowable as depending from an allowable base claim and for its own recited features which are neither shown nor described in the references of record. To the extent that claim 8 is allowable over Schwarz, the further rejection of claim 9 over the reference to Chang is not seen to add

10 anything of significance because Chang does not correct the deficiencies of Schwarz. Furthermore, claim 9 recites, "a watermark encoder to watermark the digital image using, in part, the hash value to produce a watermarked image," which is similar to an element recited in claim 5. The discussion of claim 5 above clearly indicates that this element of claim 9 is also not taught or

15 suggested by the combination of Schwarz and Chang.

Claim 14 is allowable as depending from an allowable base claim and for its own recited features which are neither shown nor described in the references of record. To the extent that claim 12 is allowable over Schwarz, the

20 further rejection of claim 14 over the reference to Chang is not seen to add anything of significance because Chang does not correct the deficiencies of Schwarz. Furthermore, claim 14 recites, "watermark the digital image using, in part, the hash value to produce a watermarked image," which is similar to an

element recited in claim 5. The discussion of claim 5 above clearly indicates that this element of claim 14 is also not taught or suggested by the combination of Schwarz and Chang.

5   Claims 3 and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Schwarz in view of U.S. Patent Number 5,465,353 issued to Hull et al. (herein referred to as "Hull").

Claims 3 and 13 are allowable as depending from an allowable base

10   claim and for their own recited features which are neither shown nor described in the references of record. To the extent that claims 1 and 12 are allowable over Schwarz, the further rejection of claims 3 and 13 over the reference to Hull is not seen to add anything of significance because Hull does not correct the deficiencies of Schwarz. Accordingly, Applicant respectfully requests that
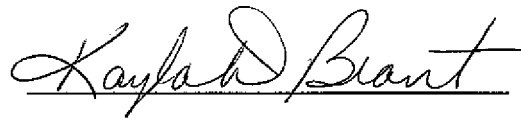
15   the 103 rejection be withdrawn.

Conclusion

Claims 1-15 are believed to be in condition for allowance. Applicant respectfully requests reconsideration and prompt issuance of the present application. Should any issue remain that prevents immediate issuance of the

5   application, the Examiner is encouraged to contact the undersigned agent to discuss the unresolved issue.

10   Respectfully Submitted,
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